

# PRELIMINARY EXPERIMENTS FOR DOLPHIN MARKING

MASAHARU NISHIWAKI\*  
MASAYUKI NAKAJIMA\*\* AND TERUO TOBAYAMA\*\*\*

## INTRODUCTION

For the purpose of getting biological data on the stock of large whales, whale marking has been done for past 30 years. However, nothing has been done on the small toothed whales. There has been no demand for scientific investigations on these whales because they have little industrial value.

In Europe, these whales, mainly the common porpoise (*Phocaena phocaena*), had been caught and utilized in the past. The oil had been used for lamplight, and the oil and the meat had been used for human consumption. Now only in the Black Sea area, they are still caught and utilized. In the other European countries, none of the small toothed whales are harvested.

In Japan, exceptionally large numbers of small toothed whales are taken annually. Over 20,000, primarily the blue white dolphin and the Dall's and True's porpoise, are harvested each year for human consumption.

The actual migration routes of these small whales are poorly known. It is known that during October through December groups of the blue white dolphin (*Stenella caeruleo-alba*) migrate from the northeast coast of Japan to the east coast of the Izu Peninsula where thousands are caught by means of the driving method. During May through July, thousand of this species are also taken on the west coast of the Izu Peninsula.

Heedless of the scientists' warnings that the stocks of this species may soon be depleted, the fishermen year after year continue to capture all ages of these dolphins including the very young. If the stock of these to be maintained, problems concerning their biology must be investigated. It is of primary importance to determine where these animals go and by what routes, once they leave the Izu shores. Occasionally this species is caught or stranded on the west coast of the United States. It is unknown if these are close relatives of those from the Japanese side.

Briefly, a marking program is essential to determine migration routes and to estimate the size of the stock from which the harvest is being made.

Dall's porpoise (*Phocaenoides dalli*) occurs on both the coasts of Japan and Western United States. True's porpoise (*Phocaenoides truei*) seems to occur only in limited waters of the Japanese side. The migration routes of both these forms are completely unknown and therefore should be studied.

In order to investigate the above problems, it is necessary to accumulate biological data based on the results of marking. Before doing the actual marking, the

\* Ocean Research Institute, University of Tokyo

\*\* Enoshima Marineland

\*\*\* Ito Aquarium

Contribution No. 72, from The Ocean Research Institute, University of Tokyo.

staff made some preliminary experiments and the results are reported in the following.

#### METHOD OF EXPERIMENT

The necessity of a marking program was explained in the Introduction. However since this was a relatively new undertaking as it applies to small whales a method had to be developed. Since it would be extremely difficult to evaluate these experiments in the open sea; they were performed in a marine aquarium. These investigations described below were performed on dolphins at the Enoshima Marineland which is located on the Katase Beach in Kanagawa Prefecture and at the Ito Aquarium in Shizuoka Prefecture. Both of them were built for the exhibition of captive dolphins.

##### *Vinyl line method*

This method consists of fastening a vinyl line to or in the base of the tail flukes or dorsal fin. This is usually done by making a small incision and tying the line through it.

In the Enoshima Marineland a total of 78 dolphins, consisting of the common dolphins (*Delphinus delphis*), the Pacific white sided dolphins (*Lagenorhynchus obliquidens*),

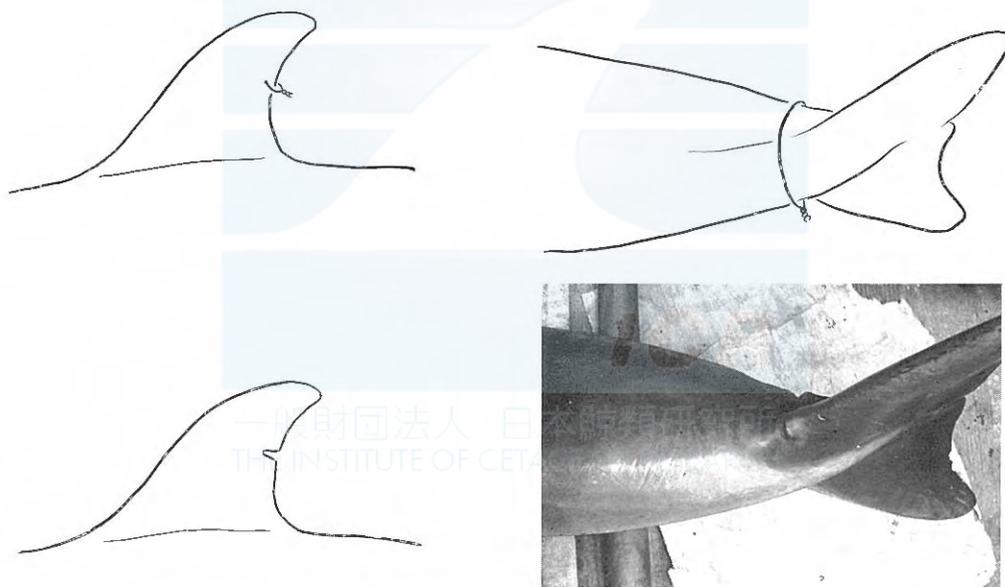


Fig. 1. Marking by vinyl line Method.

Left: Tied through the dorsal fin.

Right: Fastening to the tail.

Upper: Soon after marked.

Lower: After the mark dropped.

(A female bottle-nosed dolphin, 268 cm long marked on 11 Jan. 1958, died on 5 Jan. 1960).

the Risso's dolphins (*Grampus griseus*) and the Pacific bottle-nosed dolphins (*Tursiops gilli*) have been marked for identification prior to exhibition at the Marineland. The marks were made of copper wire 0.5 mm in diameter and covered with a vinyl tube 1 mm in diameter. Tubes of several different colors were used. An individual would be marked with one or two tubes. Also the tubes were tied by various methods by which means the animals were discriminated.

The species and numbers of these dolphins are as follows :-

1. In the 65 dolphins consisting of above four species, the lines were tied around the base of their tail flukes. (Fig. 1 right)

2. With 13 bottle-nosed dolphins a tiny incision was made with an awl in the edge of the dorsal fin and the lines were tied through it. (Fig. 1 left)

When the lines were tied around the tail, nearly all of them were dropped within a month or two. Exceptional cases were the 2 Pacific white sided dolphins which retained lines for 7 months and the one Pacific bottle-nosed dolphin which retained one for almost one year.

In the other cases, lines were tied through an incision in the dorsal fin. These lines lasted longer ; dolphins retained them for 3 or 4 months. The longest period was when a bottle-nosed dolphin retained the mark for one year and eight months.

Consideration of the causes of mark failures suggests that the copper line with its vinyl covering was too thin to be long maintained by such delicate skinned animals without doing considerable injury. The skin suffered more serious injury than did the dorsal fin. Abrasions of the skin were usually evident within a month after marking. When a mark is placed in the dorsal fin a little bleeding occurs when the incision is made. A scar results at this site. The strong up and down swimming movements of the tail flukes usually cause any lines placed on the tail to saw or cut into that member resulting in injury to that animal.

#### *Tuna tagging method*

This method is to use the same type tag as is used for tuna marking. This is a desirable type in that a number, the place to be returned etc. can be placed on the nylon tube as shown in Fig. 2. On one end of the tube is a nylon hook which is used to attach the tube to the animal. These tubes were 23.5 cm long and 3 mm in diameter. The hooks were inserted into the muscle of the animal by the use of a sharp needlelike stainless steel tube as commonly used in tuna tagging. The object of this experiment was to determine the most suitable portions of the body in which to place this type mark.

This type mark was placed on the dolphins used in this experiment immediately prior to their release in the Ito Aquarium. The dolphins were divided by species. Six rough toothed dolphins (*Steno bredanensis*) and four bottle nosed dolphins were placed in separate tanks which were each 15 m by 5 m long and 1.5 m deep.

The results of the marking are shown in Table 1.

Above experiment was done over a rather short period ; therefore the results are not conclusive but the following facts were presumed. That is, if the marks were placed into the front portions of the body, they were soon lost. Marks

placed into the rear portions of the body, were comparatively more permanent. It seems that the skin itself presents some problems. In an individual which survived a while after the mark had dropped away, showed no damage in the muscular tissue. In another one which retained marks until death showed a purulent condition and damage in a small area around the maintained mark as shown in Fig. 6.



Fig. 2. Tuna tag, used in this experiment. (Courtesy of Mr. David W. Waller).



Fig. 3. Marking with tuna tag.

Left: Rough toothed dolphin (*Steno bredanensis*) during the transportation.

Right: marked below the dorsal fin, left side of a bottlenosed dolphin (*Tursiops gilli*) (Ito No. 3).

TABLE 1. RESULTS OF THE MARKING IN THE ITO AQUARIUM

Serial No.	Species of dolphin	Body length	Sex	Date marked	Date mark lost	Date dead	Remarks
1	Rough toothed dolphin ( <i>Steno bredanensis</i> )	241	M	26 Sep. 1965	27 Sep. 1965	2 Oct. 1965	One mark remain until death
2	"	234	M	"	6 Oct. 1965	5 Nov. 1965	Two marks dropped same date
3	Pacific bottle-nosed dolphin ( <i>Tursiops gilli</i> )	315	F	14 Oct. 1965	—	2 Nov. 1965	Two marks remain until death
4	"	286	F	"	16 Oct. 1965	3 Dec. 1965	Two marks dropped same date

Body length measured in cm.

M—male, F—Female.

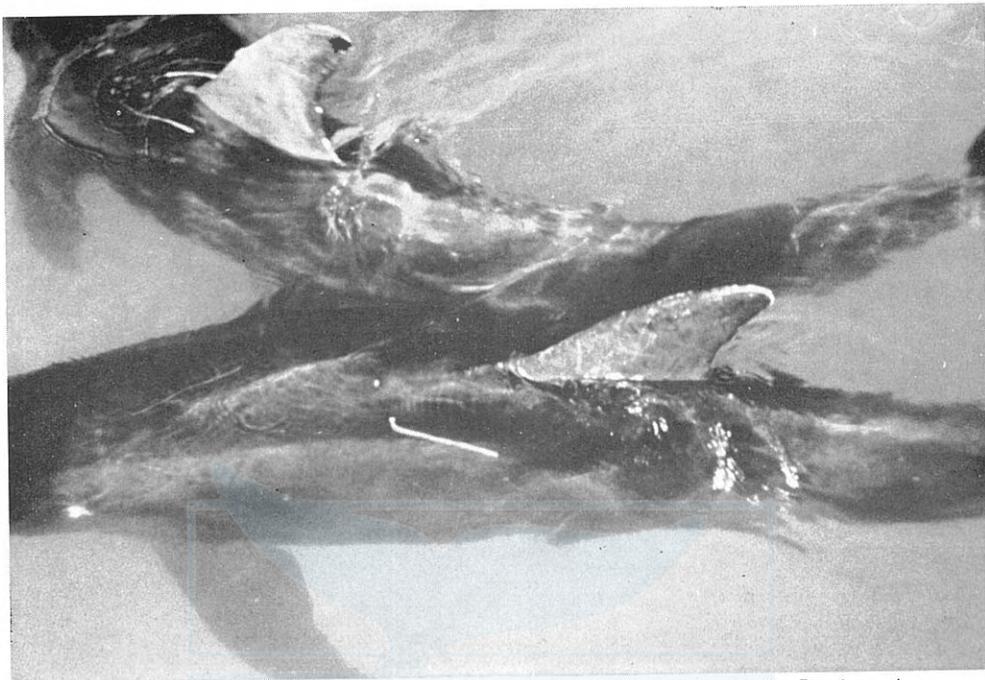


Fig. 4. Marked rough toothed dolphin (*Steno bredanensis*) swimming in the Ito Aquarium. A tag on the back of the dolphin at this side already lost.



Fig. 5. Marked rough toothed dolphin (*Steno bredanensis*) swimming in the Ito Aquarium. The tags on the dolphins were lost. The dolphin in the middle still marked.

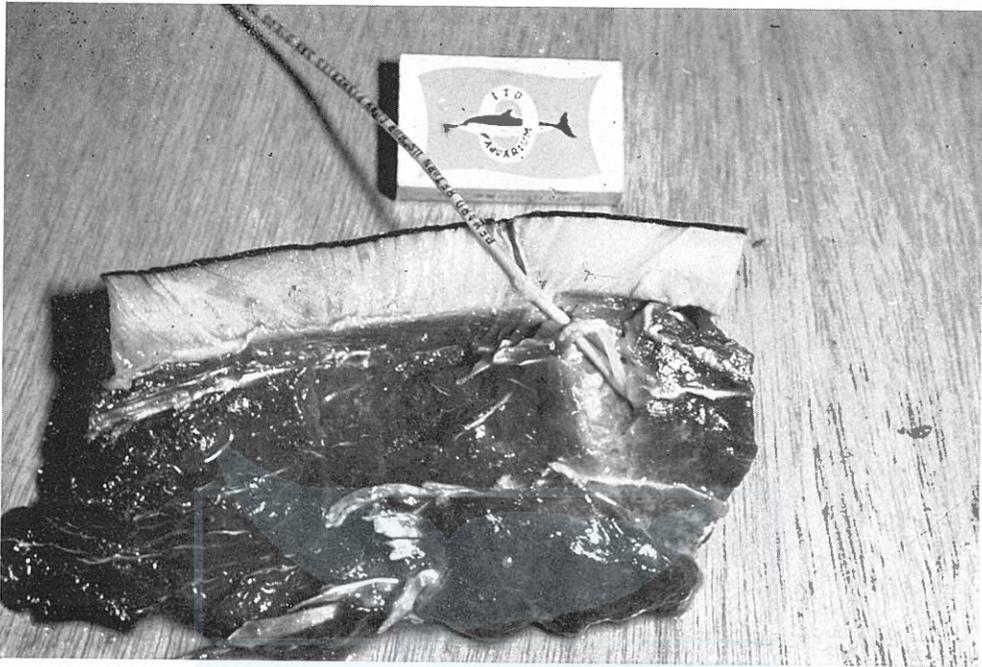


Fig. 6. Purulence condition and damage around the mark in the muscle.

It was considered that a process must be working in the tissue that rejects all foreign material which enters the skin.

In this experiment no effective method of marking small toothed whales was developed.

#### SUMMARY

1. The marking of the small toothed whales is necessary for the same reasons as the marking of the large whales.

2. Marking Experiments on the small toothed whales were carried on in the huge tanks of the seaquariums which are used for exhibition of captive dolphins.

3. The first experiment was to tie vinyl lines to the tail flukes or dorsal fin or cut a little portion of the skin in the flukes or fins to tie them through. Because of the water pressure against the swimming porpoises or dolphins, the lines dropped in a few month or they cut the skin and caused serious damage to the fins or flukes and sometimes endangered the lives of the animals. This method was tried in Enoshima Marineland, was decided to be "not effective".

4. The second experiment was to use the tags which are used for tuna taggings on the dolphins in the Ito Aquarium, but they also dropped within a month and were decided to be "not effective".

5. Both methods of tagging that were tried proved not effective. Therefore, other methods must be investigated. Some other methods that hold some promise

are as follows ; Metal bands such as used in the tagging of fur seals are a possibility. Finding a suitable location for the placement of such a tag will require investigation. Branding both by heat or extreme cold may also provide a means by which the smaller cetaceans and other marine mammals might be marked.

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一般財団法人 日本鯨類研究所  
THE INSTITUTE OF CETACEAN RESEARCH